

Toth et al.

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**REMARKS**

Claims 1-29 are pending in the present application. In the Office Action mailed May 18, 2005, the Examiner rejected claims 1, 3, 4, 6-9, 22, and 24 under 35 U.S.C. §102(b) as being anticipated by Toth (USP 5,457,724). The Examiner next rejected claims 2 and 10 under 35 U.S.C. §103(a) as being unpatentable over Toth, and further in view of Grass et al. (USP 4,578,806). Claim 5, 11, and 25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Toth. Claims 12 and 26 were rejected under 35 U.S.C. §103(a) as being unpatentable over Toth, and further in view of Fujimoto et al. (USP 5,386,446) and Hesch et al. (USP 5,212,437). Claims 13, 14, and 23 were rejected under 35 U.S.C. §103(a) as being unpatentable over Toth, and further in view of Kobayashi (USP 5,577,095). Claims 15-21 and 27-29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Toth in view of Li (USP 6,459,755).

Enclosed herewith please find three sheets of replacement drawings addressing the objections raised by the Examiner. Applicant has also made amendments to the Specification and the claims to address the objections raised by the Examiner.

In the rejection of claim 1, the Examiner concluded that the system for automatic field of view and patient centering determination from prescan scout data, as disclosed by Toth, anticipated that which is being claimed. Specifically, the Examiner concluded that the reference discloses a system and method for determining the center of mass of a patient and repositioning the patient in a medical imaging scanner as needed based on the position of the center of mass. The Examiner's conclusions, however, are not supported by the explicit teachings of the reference.

Toth does not determine the centroid or center of mass of a subject. The center of mass is generally defined as the central point of total mass of a subject or object. In other words, the center of mass is "the point at which the total mass of a body or system is assumed to be centered and upon which the sum of external forces can be considered to act." MSN Encarta, [http://encarta.msn.com/dictionary/1861687330/center\\_of\\_mass.html](http://encarta.msn.com/dictionary/1861687330/center_of_mass.html), (copy enclosed). Other terms for "center of mass" include "center of gravity" and "centroid". Id.

In contrast, Toth discloses a system for estimating the physical center of a patient, not the center of mass of a patient, based on two orthogonal projections. Specifically, Toth discloses the acquisition of scout data that "is comprised of two orthogonal views from each slice position in the prescribed scan, one at a gantry angle of 0° and the other at an angle of 90°." Col. 3, ll. 33-38. After the scout data is corrected for offsets and normalized to a reference detector, the scout data is filtered to "mask[ing] out attenuation due to undesired objects such as patient table, followed

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by low pass filtering the scout data using an 11 point box car filter." Col. 3, ll. 43-45. Thereafter, "the edges of the patient are then located in each scout projection." Col. 3, ll. 46-47. In this regard, "[t]he attenuation data for each detector element (i) in the projection is compared to a threshold (thresh=1.5) and the lowest detector [ $low_0$  and  $low_{90}$ ] and the highest detector [ $high_0$  and  $high_{90}$ ] located at the ends of the longest contiguous string of readings above the threshold are selected as shown in FIG. 4." Col. 3, ll. 46-53. The low and high readings for both the 0° and 90° gantry angles are summed and then divided by two to give the "center 115 of the patient 15" location. Col. 3, l. 54. In this regard, Toth teaches determining patient edges at two orthogonal views, summing the attenuation at the patient edges for both views, and then concluding that the physical center of the patient in the two orthogonal directions is located at the mean attenuation values, respectively. The "center of patient" technique disclosed by Toth has drawbacks akin to the techniques identified in the present application that the claimed invention overcomes. That is, "edge detection methods rely on identifying the center of the patient indirectly by detecting the edges of the patient, which can be particularly susceptible to error" and lead to a loss in SNR as a result of patient mis-centering. Application, pp. 5-6.

In sum, Toth teaches a technique for identifying the physical center of a patient in two orthogonal directions based on the edges of patient; such a technique is not equivalent to determining the center of mass of a patient. The "center of mass" is the point at which the total mass of the patient is assumed to be centered and upon which the sum of external forces can be considered to act, whereas Toth discloses a technique whereby the physical center of a patient is indirectly measured from the measured edges of the patient. As set forth in the present application, such an edge detection system fails to properly consider irregular subject shapes and sizes when finding "patient center". In other words, the physical center relative to edges of a patient may not represent the central point of total mass. That is a shortcoming of the technique disclosed by Toth that is overcome by the invention of claim 1.

Accordingly, Applicant respectfully believes Toth fails to teach or suggest that which is being called for in claim 1. As such, claims 1-14 are deemed allowable.

Regarding the rejection of claim 22, Applicant has amended the claim to clarify that the step of "adjusting an elevation of the subject to reduce the value of mis-elevation" is done "automatically". Toth explicitly teaches a non-automatic adjustment of patient elevation. That is, "Since centering of the patient about the system isocenter 19 is an important factor in image quality, it is contemplated that the operator may choose to change the table height before

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conducting the scan if the vertical offset  $Y_{off}$  is excessive." Col. 4, ll. 56-60, (emphasis added). Clearly, with the system of Toth, operator intervention is required to correct for mis-elevation.

In contrast, the method of claim 22 calls for the automatic adjustment of elevation to reduce a value of mis-elevation. As such, the invention of claim 22 is patentably distinct from that disclosed and/or suggested by Toth. Allowance of claims 22-26 is therefore requested.

Claims 2 and 10 stand rejected under 35 U.S.C. §103 as being unpatentable over the combination of Toth and Grass et al. Applicant respectfully disagrees with the Examiner with respect to the art as applied, but in light of claims 2 and 10 depending from what is believed an otherwise allowable claim, Applicant does not believe additional remarks are necessary and, therefore, requests allowance of claims 2 and 10 at least pursuant to the chain of dependency.

Claims 5, 11, and 25 stand rejected under 35 U.S.C. §103 as being unpatentable over Toth. Applicant respectfully disagrees with the Examiner with respect to the art as applied, but in light of claims 5, 11, and 25 depending from what are believed otherwise allowable claims, Applicant does not believe additional remarks are necessary and, therefore, requests allowance of claims 5, 11, and 25 at least pursuant to the chain of dependency.

Claims 12 and 26 were rejected under 35 U.S.C. §103 as being unpatentable over Toth and further in view of Fujimoto et al. and Hescht et al. Applicant respectfully disagrees with the Examiner with respect to the art as applied, but in light of claims 12 and 26 depending from what are believed otherwise allowable claims, Applicant does not believe additional remarks are necessary and, therefore, requests allowance of claims 12 and 26 at least pursuant to the chain of dependency.

Claims 13, 14, and 23 stand rejected as being unpatentable over Toth and Kobayashi. Applicant respectfully disagrees with the Examiner with respect to the art as applied, but in light of claims 13, 14, and 23 depending from what are believed otherwise allowable claims, Applicant does not believe additional remarks are necessary and, therefore, requests allowance of claims 13, 14, and 23 at least pursuant to the chain of dependency.

Claims 15-21 and 27-29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Toth in view of Li. Claims 15 and 27 call for, in part, determination of "a centroid" of a subject. As presented earlier herein, Toth teaches a system that estimates the physical center of a patient based on the edges of the patient. Such an edge detection-based technique has drawbacks that are overcome with a centroid-based technique, as claimed. The system of Toth is predicated upon identifying the physical center of a subject which, as presented in the present application and reiterated herein, may not correspond to the center of mass of the subject. In this regard, one

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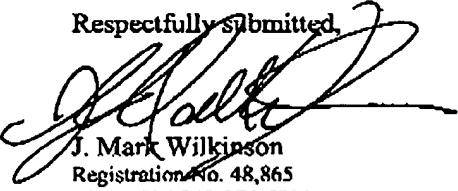
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skilled in the art would readily appreciate that Toth neither discloses nor suggests a system that identifies the center of mass of an object or subject. Li likewise fails to teach or suggest determining the center of mass of a subject. Accordingly, claims 15-21 and 27-29 are believed to call for subject matter that is patentably distinct from that disclosed and/or suggested by Toth and Li. Allowance thereof is therefore requested.

Therefore, in light of at least the foregoing, Applicant respectfully believes that the present application is in condition for allowance. As a result, Applicant respectfully requests timely issuance of a Notice of Allowance for claims 1-29.

Applicant appreciates the Examiner's consideration of these Amendments and Remarks and cordially invites the Examiner to call the undersigned, should the Examiner consider any matters unresolved.

Respectfully submitted,



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